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A survey of schools both using and not using programed materials was presented. A questionnaire was sent to 14,000 school systems. Answers were returned from 1,671 school systems who did not use programed materials and 209 school systems who did. Of those who did not use programed instruction, 84 percent reported familiarity with such terms as programed instruction, teaching machines, and programed learning. This familiarity with terms indicated the impact of this new field upon education. Sample programs were used by both user and nonuser school systems. Teachers and curriculum coordinators were responsible for initiating most programs.

The major use of the programs was at the junior and senior high school levels. A good percentage of the users employed programed materials without any machine. Some schools allowed only a few students to participate in programed instruction; others used it as an integral part of the curriculum. The teacher's role ranged from being an active supplementary source to being only a proctor. Evaluations from the school systems of program content were favorable.

Case studies of different school systems included a large metropolitan school system which was a pioneer in the field of programed learning; smaller, urban systems; and a rural school system. They showed individual approaches to the use of programed materials. The school systems included Denver, Colorado; Manhasset, Long Island; Farmingdale, New York; and Ulster County, New York.

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SCHOOL USAGE OF PROGRAMED INSTRUCTION

INTRODUCTION

This present paper, in attempting to give a picture, both general and specific, of what elementary and secondary schools are doing after three years of increasing exposure to programed instruction, has evolved into a paper with a point of view.

For general coverage it contains an abstract of a nationwide survey. For more specific detail it ranges from a large metropolitan pioneer in the use of programs through smaller systems and individual school approaches to a rural plan of action. In examining these varied approaches to programed instruction, a parallel situation, that of dealing with individual differences, emerges as a recurring, current, and unsolved problem.

The diversity of response to this problem, which once seemed so simple to early programers, will prove, we trust, not merely interesting but genuinely helpful.

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SURVEY SUMMARY

In a survey taken last year by the Center for Programed Instruction at the request of the United States Office of Education, the largest single category of responses were obtained from school administrators who considered themselves "non-users" of programed materials. This group consisted of 1,671 of the total population of over 14,000 school systems to which the questionnaire was sent. Two hundred and nine systems returned the "user" questionnaire and two hundred and eighty-two reports of individual program use were received as of July, 1962. The overall familiarity of even the "non-users" with terms of the programed instructional field provides some indication of the impact of this new field upon educators. Eighty-four percent of this group reported familiarity with the terms "programed instruction," "teaching machines," "programed learning," etc., while 73% even reported having seen a teaching machine of some kind.

As to the sources of their information, for both users and non-users professional publications play the dominant role (over 70%) in providing initial information about programed instruction. The great utility of Lumsdaine and Glaser's NEA collection of articles is apparent in its dominance of the early literature which both groups have read.

Actions taken—General

The gathering of sample programs is the predominant activity of both users and non-users, and a surprising 34% of those schools using programs are employing consultants along with them. Activity among the non-users leans toward the setting up of planning groups, while 33% of the users have sent staff members to workshops. Some 14% describe their systems as using research design and controls in "formal" experimentation. A few of these have included, with their returns, varying degrees of research reports. In line with this information activity, it is the users who have made the greater attempt to inform local lay groups about programed instruction, as well as their own activities in the field.

It apparently takes less than a year for most schools to get from initial contact to program implementation. Within those schools which were using programs a year ago (Spring, 1962) teachers and curriculum coordinators have been responsible for initiating most of the program use, although there is considerable variety in this role. On the other hand, 50% of the users did not answer the question as to whether teachers were provided time for either using or developing programed materials. While most programs were obtained from commercial sources, a respectable 19% have been locally programed, a good indication of the active involvement of some of the users. As indicated above and substantiated in detail in the case histories to follow, provision made for teacher activity in either creation or use of programs ranges from a substantial commitment of both time and money down

to completely voluntary efforts by teachers themselves. It is also the teacher who is most often the director of any program project; one hopes that this direct involvement of time and efforts in the development and utilization of this new technology will be acknowledged by school administrations.

Patterns of Usage

During the school year of 1961-62 mathematics programs were the most available and the most used. The costs of these programs (as well as those in other subjects) appear to be between 10 and 15 dollars per copy, and it is therefore not surprising that most are reused several times. Those that have been designed as "consumable" are being made reusable by means of locally developed answer sheets. The major use of these programs has been reported at the junior and senior high school levels, but half of the programs are also reported as receiving some use at or below the sixth grade. The students using programs generally are considered of average intelligence or above; and for the most part (%) the programs were a regularly schedule part of regular classroom instruction. The teacher in such classes most often (%) was engaged in actively supplementing the program.

Seventy-three percent of the users are employing programed material without any machine. Whatever other factors may also have been invoked in these decisions, the point of the Goldstein and Gotkin review of research comparing machines and texts is well taken. In their survey, no significant mastery differences were found and more often than not the text proved faster. At pres-

ent, most use of programs is without simultaneous supplementary materials, although the program itself may constitute only a part of the total instruction within a given course.

Eighty percent of the schools using programs were at the "few student" or "groups of pupils" trial stage, but about 70% of these schools did indicate that they were in the process of incorporating programed materials into regular instruction. About half as many indicated that they were using programs as an integral part of the curriculum, although constituting only a portion thereof, which would seem to bear out the trial nature of classroom use of these materials. Eighty-four percent of the usage was in class; 20% was in study hall; and 22% was at home. That is to say, some schools restrict the use of programed materials to the classroom while others let youngsters work on programs both in class and out.

The Teacher's Role

Even in these preliminary experiments with programs in the school, 60% of the users report that the teacher participates as an active supplement to the program; 40% report that the teacher is "available for questions;" and only 11% report teachers being employed as "proctors only." Presumably, to a great extent this group was purposely trying to minimize the "teacher variable" in order to evaluate the effectiveness of programed materials in and of themselves.

Evaluations

Content: Evaluations of program content were generous (almost half considered their program content "modern") and while many respondents felt that it was too soon for overall evaluation, in general the evaluations that were made clearly leaned towards the favorable side.

Reactions of the schools and those closely associated with them, such as parents, etc., to the use of these early products of programed instruction were also favorable. Parents, teachers, administrators, boards of education, and students all show remarkably similar profiles of opinion. Very little of this opinion was at all unfavorable.

No unfavorable reports at all were found by another survey of 30 effectiveness studies done by Quackenbush at Penn State. Most of the benefits he found reported by users of programed material were peripheral or auxiliary. That is to say, the regularly reported lack of significant difference in content mastery was often offset by improved attitude and increased student activity.

The most common early use of programed materials has been within large school systems. However, it is interesting to note that 46% of last year's users tried programs with only a few individual students, rather than with whole classes. Only 37% plan to make use of programs with individual students during the coming year. It will be interesting to see if this figure is substantiated by this year's survey. If it is, it will likely indicate a growing readiness on the part of school administrators to pass from an experiment with one or two

students to large scale trial of programed materials rather than any substantial commitment.

If some of the specific findings reported in the following case studies prove to have general validity, these individual usage figures will bear close attention in future surveys. The opportunities for individual usage of programs appear to be just emerging, not merely as facilitated, but as actually forced by large group use of programed materials.

THE CASE STUDIES

Denver, Colorado

The public school system of Denver, Colorado, was among the first large city systems to investigate programed instruction. Consistent with the findings of the national survey, this large city system was introduced to programed instruction by the office of the Superintendent. For it was through the Superintendent's personal interest that in 1959 Denver became the first school system in the country (large or small) to free a teacher from classroom duties to receive training in programing. As might be expected, therefore, Denver is among the few school systems to have developed a substantial amount of programed materials for use within its own curriculum. To date, programs in English usage, the mechanics of writing, Spanish and the U. S. Constitution have been programed by Denver teachers, who have been employed by the school system to program during the summer and on their "free time" during the school year.

Other facets of Denver's experience with programed instruction have included: a research study designed to investigate the attributes of a particular programed textbook;( ) research into the effects of various schedules of "confirmation of response" during the use of a mathematics program by students of low, average, and above average ability, and a third study designed to test the use of programed instruction in combination with Educational Television in the teaching of Spanish.( ) This latter experiment, which is part of a larger project ( ) is unique in that it is a first large scale attempt (75 schools are currently involved) to use individually paced programed material as a complement to group-paced televised instruction. This experiment is of interest also because it utilizes the audio-visual resources of television to to present the "conversational" portions of the Spanish course, while leaving instruction in reading and writing to teacher-prepared programed textbooks. Thus, it represents a conscious division of an instructional task between an audio-visual medium and the printed word, with each employed to teach specific and separate behavioral objectives. One only wishes that research in language learning were able to supply evidence on which to base such a "division."( ) Nevertheless, after a year of experimenting Denver has been able to offer some pragmatic proof that such a division of instructional labor is both workable and effective.( )

The initial use of programed instruction in the schools of Denver (196) was within the narrower context of an experiment designed to answer four specific questions about a specific programed textbook; in fact, the first such book to be published commercially( ) and the questions asked were:

1. Does English 2600 work equally well with pupils who have low academic ability as it does with those who have average and high achievement?

2. Is learning substantial for students who have worked through English 2600, compared to those with more traditional learning experiences?

3. How long does it take for students of varying abilities to work through English 2600?

4. Which parts of the book are especially difficult?

These four questions were asked in direct reference to a particular (but hardly unique) problem faced by the Denver schools. The problem: How to improve students' ability to write coherently. While perennial in most schools, this problem was somewhat intensified in Denver during the late 1950's by an increasingly mobile school population and an influx of larger groups of Spanish-speaking children into city schools.

To meet its needs, therefore, Denver was looking for a self-instructional program that might be used for bringing a large diverse group of students up to a baseline of acceptable achievement in certain aspects of English usage. Having achieved this, more students would then be in a position to benefit from a rather extensive and somewhat unique system of teaching composition through what has been called the Lay-Reader System (developed by Dr. Paul Dederick

of the Educational Testing Service and pioneered in the Denver schools). Three of the four questions (Does English 2600 work equally well with pupils of low, average and high academic ability? What is the range of time needed for such a heterogeneous group to complete 2600? Is learning with English 2600 substantial?) were directly related to Denver's own particular problem. The fourth question having to do with which parts of the program were especially difficult, is of interest from a somewhat different standpoint. For as a result of this experiment Denver discovered that this programed course did produce substantial learning in all ability groups; furthermore, that the range in working time (9.68 to 14.23 hours) did indicate that the programed method made ample allowance for individual differences in reading speed and working habits. However, it was also discovered that "English 2600 proved to be more effective with students who have high ability." Bright students in the experimental group scored higher on both standardized and non-standardized measures than did their counterparts in the control group who did not use English 2600. On the other hand, the low achievers "who did not use English 2600 scored higher (on both measures) than those who did." With average students there was no significant difference in achievement between the experimental and the control groups.

On the completion of this study Denver had an important question to answer, namely, did English 2600 meet the particular instructional needs of

somewhat unique high school English curriculum? An answer to this question is to be found by observing current practice in Denver, i.e., two academic years after the study with English 2600 was launched. Today in Denver English 2600 is not being used; however, as has been indicated, programed instruction is. The version of English 2600 used in 1960 did not meet Denver's needs for low ability students, and a second version of the program seemed no better equipped to meet these needs because while "frames had been added to the program the committee could dind none that had been changed." ( ) Therefore, those frames that had been identified by the Denver study as being especially difficult had not been (in the opinion of the Denver staff) sufficiently revised to indicate that the program could now meet the needs of low ability students in the Denver schools.

As a result Denver has done what many other (19%) of the schools using programed instruction have attempted; namely, set out to design and create programs specifically aimed at their own particular needs.

In thiscase, as has been indicated earlier, Denver has employed a group of its English teachers to create a series of programed text units each dealing with a specific need of the students engaged in the "lay reader system" of teaching English composition. These programed units are employed within the system as follows. First of all, the student writes; then his work is graded by a "lay" or non-professional reader who has been trained to spot certain key errors (by members of Denver's professional teaching staff). Each type of error a student makes is recorded on an error grid which eventually supplies

his English instructor with a profile of that particular student. Then and only then does programed instruction enter the picture.

Using the error grid as a diagnostic instrument the student is assigned to a series of programed units designed especially to remedy the types of errors he has made in his written work. As the directors of this program put it:

> "...if it becomes evident that a pupil is having difficulty with dangling modifiers, he will be given a programed booklet on dangling modifiers. It will be designed specifically to help him overcome his trouble." ( )

Having looked at some statistical data on general usage of programed instruction and then having narrowed our examination to view the range of programed instruction activity within a single large city school system, we now narrow our sights still further in order to examine a single, but extremely important, aspect of programed instruction.

The aspect we shall now attend to is programed instruction's much talked of ability to meet the challenge of what is commonly labled "individual differences." We have already noted how in Denver the program English 2600 was found to be incapable of meeting the broad range of individual differences that existed in a group of 250 tenth graders. And we have seen how in order to meet these individual needs the school system has created programs of its own which seem better able to achieve this goal. Next we propose to look at another school situation (this time a suburban one) in which once again ingenuity and effort on the part of both teachers and administrators was required

in order to help programed instruction successfully meet the challenge presented by a broad range of individual differences. Here, as in Denver, the program has not been able to meet the challenge alone. Thus, if we were to state a thesis drawn from our small and totally inadequate sampling of programed instruction users, it would be something to this effect:

> Many pioneers in the field (initially B. F. Skinner (see insert below) made statements regarding programed instructions's ability to accommodate a wide range of individual differences. Programed instruction as it now exists is clearly not yet accomplishing this to anything like the degree to which such statements indicated it might. A second point in this thesis is that the schools that are meeting the challenge of individual differences are, in fact, able to do so only because of a good deal of ingenuity and effort on the part of teachers and administrators alike.

> Differences in ability raise other questions. A program designed for the slowest student in the school system will probably not seriously delay the fast student, who will be free to progress at his own speed. (he may profit from the full coverage by filling in unsuspected gaps in his repertoire.) If this does not prove to be the case, programs can be constructed at two or more levels, and students can be shifted from one to the other as performances dictate. If there are also differences in "types of thiniing," the extra time available for machine instruction may be used to present a subject in ways appropriate to many types. Each student will presumably retain and use those ways which he finds most useful. ( )

Manhasset, Long Island

In this suburban New York community, it was a teacher, John MacGowan of Manhasset High School, who initiated the use of English 2600 almost as soon as it was off of the presses. From the start, Manhasset was concerned with comparing their existing techniques with the new materials. Recognizing the importance of surveillance in their early stages of innovation, Manhasset also elected to use its programed materials exclusively in class. But, being bolder than most other schools, they very early decided to try the experiment with a full quarter of their eighth grade grammar population, plus 25 seventh graders. This meant that Manhasset was using 75 pupils as its very first experimental population, with 150 eighth graders and 175 seventh graders as its control groups, taking conventional grammar instruction.

Three of the five 40 minute periods scheduled for an English and Social Studies block were spent with the program. After three months of preliminary study, during which the groups were selected for the experiment, and during which no formal grammar instruction was given to the experimental groups, the experiment was started in January of 1961. Three of the five 40 minute periods scheduled for an English and Social Studies block were spent with the program. On a typical day, each student picked up a copy of the programed text and a response sheet as he entered the room. He first wrote the frame number at which he bagan (approximately, but not always identical to the next frame after the one completed at the previous session), and worked

fairly informally at his own pace, writing the response on the separate sheet. Since this was an experimental population, the student was given only minimum assistance by the monitoring teachers (underlining and clarification of terms for the most part).

As soon as the student finished a unit of the subject matter, he went to the front desk and received a copy of the appropriate unit test, which he completed, returned to the teacher, and saw graded almost immediately. If he did not achieve at least80% mastery on this test, he returned to the unit for more study, and subsequently tried an alternate form of the unit test. If he missed 80% a second time, or a third, or more times, using the tests alternately, he was kept at the unit until he either mastered it, or else was moved along mechanically with the few remaining at the end of each unit. Bright students moved very rapidly with this system, average students made satisfactorily regular progress, and only the few for whom grammar is always a problem had to be moved along without making the 80% criterion "on their own."

Since English and Social Studies shared the block of time in Manhasset's curriculum, the two non-programed material periods were devoted to Social Studies class and discussion. During this experiment, grammar was emphasized in these periods no more than would otherwise be true of any eighth grade class.

Of the 75 students starting this experiment in January, the first girl completed the whole programed text in early March, in just over

nine working hours, and she was started immediately on composition writing under individual teacher guidance. This meant that composition writing (ostensibly the rationale for studying grammar) began in early March and occupied the rest of the student's year, rather than, for bright students especially, dragging out the grammar at the slower class pace. Each student subsequently completing the program was similarly freed for semi-independent writing, and the whole group completed its grammar requirements on or before the end of the year, despite the delayed start, witn results which were felt to be highly satisfactory to the school, the students and the parents. However, the school did not feel that it had a sufficiently objective measure of achievement for either experimental or control groups at the time. It has only been recently that an adequately standardized grammar test has been available and used for this purpose. While the experimental teachers felt that the students, as a group, showed superior use of Capitalization, Punctuation, and Subordination (the use of subordinate phrases and clauses), it was only recently, in the administration of the standardized test two years after the experiment was run, that these students showed up clearly not only as well as, but with up to 30% better than, the results with other tenth graders still in the school.

In October 1961, English 2600 was adopted for a larger testing with 50% of the students. A somewhat unwieldy 519-item pre-test, correlated with the units of the book, was given to all 100 students.

Any unit score of 100% released the student from having to go through the appropriate of English grammar. Before Thanksgiving, the firs t student, taking full advantage of the pretest exemptions, completed her grammar requirements in 7 1/2 working hours. By early December there were five students who, this time, were removed from the program room, and given almost individual attention in their composition writing. This newly established class, chosen on the basis of three months performance rather than mere opinion or a single selection test, was filled in January, with obvious gains in opportunity to write compositions for the rest of the year. Such 80% to 60% gains in freed time, especially for bright students, constitute quite an addition to the student's own curriculum, just at a time when there "never seems to be enough time to teach everything."

In a more recent experience, another unusual occurrence helped shape Manhasset employment of programed material. Even before the first student had finished the program, 28 of the 100 experimental group made their difficulties well enough known to the teachers in charge so that they they were pulled out of the regular sessions with the program and given supplemental help. This group was the first to be given a separate classroom, along with a teacher who was well aware of the special nature of the group. These students still used the programed text, and worked at it regularly, as judged appropriate by the teacher, but where the programed unit did not do the job, this group had supplemental class and individual discussion, along with other more conventional grammar teaching assistance. As soon as any student in

this group seemed to be rolling again, he was allowed to rejoin the large group, once again moving at his own pace. A side effect of this prompt identification of problems has been a reduction in "social delinquents," such as the youngster with the 137 IQ who was not doing the program at all well. After two weeks "with the dummies" he not only improved, but he was one of the first of the total group to finish the grammar.

Even with the slowest students, who had to be helped almost mechanically to complete the course, and who in grammar populations wherever they exist, the program offered a very sizeable advantage over regular class activities. Every response made by the student had been recorded, not only in the program but also in each unit test that he had taken, to say nothing of the pre and post tests. Rarely has such complete material been available as diagnostic assistance for the teachers of these students.

Here, then, we have an example of administrative flexibility when faced with the problem of slower individuals. The perceptive response to the restive students having trouble with the program and who were detected so early by the sheer number of responses required of every student, meant that individual treatment could be directed at the student almost before they could be called problems.

Present usage of English 2600 is even more flexible. Even in the present brighter student population (defined and selected so that no student has an IQ below 100) there is a self-identified sub-group which any student may join at will, where he will get individual and class attention as necessary.

Such a student may also rejoin the larger and less personal section as soon as he gets over the problem which he had himself diagnosed. As one teacher says, "We have refined and refined to make this imperfect thing (the program) go, and the encouraging thing is it gets easier and easier to do. All teachers involved have been through each step of the process and new wrinkles can be added to individualize the material as long as rooms and teachers are available. While the program was not what we thought we would be getting, we have begun to achieve a system in which the status of the individual student is remarkably free. He can move out of the main group into a smaller help unit almost at will, and rejoin it as soon as he gets moving again."

If the first student through the program saves 40 or more of the 50 hours heretofore allowed for grammar instruction, and if the average saving is only 20 instructional hours, when you are dealing with 200 grammar students the savings are most impressive. Couple this with an increased diagnostic acquaintance * with eight times as many students, and the spectre of mass education by impersonal materials is hard to take seriously.

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* By diagnostic acquaintance, the teacher involved referred to the fact that formerly he had "known" his one class of 25 grammar students and felt like a relative stranger in the eighth-grade wing of the school. In correcting the unit tests and going over them with the students to spot problem areas, he found that he now knew almost all 200 students in the eighth grade, and in many cases knew more about them both as students and as individuals then he had known about most of the 25 he had had formerly in class.

As a final note to Manhasset's current work, the first twelve students through the current program with English 2600 have a minimum final mastery score of 90% and one can see how both teachers and administrators feel most handsomely rewarded for their attention to and flexible experimentation with this crude and early tool. Like the rate in the famous Columbia Jester cartoon who, when he presses the lever delights in watching the lab man run over and drop the pellet into his food tray, the question here is: Who is shaping whose behavior? Indeed, can Walden Two be far away?

Farmingdale

In another suburban school system, a different English program was used to see how effective an eighth grade level program (intended for and developed upon eighth graders) might be with academically gifted (135 IQ, eighth-grade reading ability) fourth and fifth graders who were also divided into high and low creativity groups. Since teachers were active in helping half of each group, they merely supervised theother half. Significant gains were in English usage were made by all groups--fourth or fifth graders, high or low creativity, with or without teacher augmentation--as a result of exposure to the program.

While pretests indicated a significant difference between fourth and fifth graders at the start, students from both grades ended up with a similar performance level. An active teacher apparently helps fourth graders more than fifth graders, and less creative children more than the highly creative in both grades. Creative fourth graders, working on the program without teacher augmentation, made the greatest gains of all the groups used (between 80 and 95%).

In no case--withor without teacher assistance, and high or low creativity grouping--were these gifted fourth and fifth graders who possessed the required reading level (by at least one standardized test of reading) able to reach the mastery level of the typical eighth graders for whom this program was standardized.

Farm - 2

Possible alternative interpretations are discussed in the original report (Gotkin-Massa, 1963) but at least for the moment the single program, even with appropriate reading level as the most obvious prerequisite, can not yet serve equally for all comers even with help from the teacher.

Hamden Hall

Perhaps the extreme ease (within an actual school setting) for handling individual differences among students through automated instruction is represented by the work of O. K. Moore at Handen Hall Country Day School near New Haven, Conn.

Moore has named this method "Responsive Environment Learning" which is made up of computer-driven talking typewriter (complete with projector screen). In this restricted but at the same time permissive environment a pre-school youngster is first allowed to associate the symbols on the typewriter keys he presses with: a) their names (tape spoken "as a response" and b) the printed letter on the typewriter platen). (Moore regularly resists any notion that his material, or the moment-to-moment procedure, is sequenced in the usual "programed" sense.) However, sixty children who have been exposed to this technique during the last two years have started first grade with a fourth grade or higher level of reading ability.

However, despite this impressive electronic teacher, the present secret of Moore's success in getting these youngsters to read by the time they are three or four years old seems to lie

in the great sensitivity and patience of the human teachers he has trained to compliment their machine counterpart. These teachers are selected for their responsiveness, their lack of authoritarian approach, and their interest in the general goals of moving the child ahead as rapidly and pleasantly as possible.

Moore's work, provocative as it now stands, is but the first of many steps towards a large-scale computer-based system which it is hoped will eventually be so sensitive to the student that the program will sequence itself in direct reaction to each student's every response; complete with as many nuances as are recognized and included in the computer program. Hence, both in theory and in practice, no student should ever (need to) get exactly the same items and/or sequence that any other student gets.

There are three major components to this system. Computers have long been available with capacities and speeds suitable for handling (by multiplex) 10,000 students simultaneously, which should help amortize the sizeable initial investment. Input and output devices are improving and will surely be expedited as educational pressures mount. However, a highly sensitive and enormously flexible arrangement of the subject material (i.e. the program) is likely to remain the missing link in the system for some time to come.

Ulster County, New York

In Ulster County, N.Y., about 100 miles north of New York City, the local Board of Cooperative Educational Services, as one of its elected services to its member schools, has initiated a training program designed to help teachers become intelligent users of programed instruction. It is hoped that with such training given prior to the introduction of programed instruction into its schools, the Ulster County schools can begin not where Denver and Manhasset started three years ago, but from where these schools are today. The question is: What kind of training ought to be given to best achieve the sophisticated behavior needed in order to capitalize on the experiences of others rather than to simply copy it.

In order to find out, the Ulster County Board asked the Center for Programed Instruction, a non-profit, educational organization, to enter into an experimental training program during the 1962-63 academic year. The training is not in writing programs--although this activity is encouraged--nor is it aimed at evaluating programs, but rather an attempt is being made to bring this group to the most reasonable level of sophistication possible in ten sessions in these areas:

learning theory

terminal objectives of learning (education)

problems of the program writer and user

reading and evaluating research in programed instruction

The specific goal of these training sessions is to develop the interests and talents of a cadre of individual teachers who will jointly and individually serve as consultants for the County as well as its environs. This group will serve not merely for selection, but far more importantly, will comprise an intelligent local resource group for whatever usage problems arise. Whether these problems involve individual differences of student background or performance, the goal is to have the local staff feel confident in its ability to adapt the material or its method of use--to best achieve the goals that the program by itself may not as yet be able to achieve.

Conclusion

Programed instruction, as now evidenced in print or on film, shows little ability in handling individual differences. Large numbers of individual and very diverse students do go through programs and are apparently not harmed thereby. And at least one teacher has been involved not only in using but in adapting programed material long enough to be convinced that eventually the program itself will accommodate a large proportion of individual student differences.

This future program will gain its greater flexibility by branching, by multiple tracking, and by guiding laboratory and other supplementary behavioral activities. At present this promise is fulfilled only by dint of administrative ingenuity and flexibility, by teacher sensitivity and experimentation, and by just plain commitment to getting the most out of the combination of student and program. It must not escape notice, however, that not only may a considerable proportion of this direction of activity be assumed by future programs, it has been the highly (active and reactive) stimulating nature of present program use which has allowed us this glimpse of what can be done. Changes have come and will continue to grow--in the curriculum, in the text, and in the role of the teacher, by this fortuitous and overdue placement of the student in more active contact with the subject matter.